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SMART CIRCUIT

Strategic Recommendations to Support Reg. Policy Scale Up & Transnational Synergies

D2.4.3 – A report for A2.4

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A. Executive Summary

1. Project Overview

SMART CIRCUIT's objective is to champion DIH network & actor's role to fast-track the uptake of digital/tech driven Circular Economy to enable a resource-efficient & competitive transition in CE manufacturing.

Project Partners (PPs) foster 3 transnational solution systems (WP1: the Circular Innovation Academy (CIA), WP2: the Circular Industry Strategy Lab (STRATLAB), WP3: the Circular Industry Factory (FACTORY)) to bring multi-stakeholder (Enterprise/Policy/RTO/BSO, etc.) benefits & deliver a transnational approach at the intersect of digital/RIS3/circular economy strategies. PPs build capacities, reduce barriers, leverage finance & promote closing-the-loop through the identification, dissemination and implementation of key circular economy knowledge and principles within 3 key value chains (Electronics/ICT, Textile, Construction) and a combined cross-value chain (emphasizing regional specificities).

Associated to A2.4, EXPAND! Transnational Circular Industry Futures Strategy Lab Solution: Roll-Out to Implement Circular Policies & Bridge Territory/Strategy Gaps through Smart Specialisation Synergies

2. Scope of Document & Summary

The scope of the current report, deliverable 2.4.3 (D2.4.3), encompasses the development of strategic recommendations to support regional policy scale-up and strengthen transnational synergies for circular and digital transition within Central Europe manufacturing ecosystems. It builds on the results of industry interviews, STRATLAB pilot activities, and the analysis of existing DIH/EDIH service landscapes, translating these inputs into actionable guidance for RIS3 implementation and policy–industry alignment.

D2.4.3 presents a structured framework that connects EU-level policy priorities with regional innovation strategies, while outlining concrete instruments, service models and governance approaches to accelerate the adoption of circular economy practices. The report integrates insights from multiple stakeholders, including SMEs, policymakers, DIHs, clusters and research organisations, ensuring that recommendations reflect both strategic and operational realities.

Our findings highlight the critical role of brokerage, ecosystem coordination and integrated service provision in enabling circular transition. In particular, the report shows that successful scale-up depends not only on funding instruments, but on the ability to align digital innovation, regulatory requirements, business model transformation and value-chain collaboration within a coherent support system.

The report identifies specific gaps and opportunities in the current innovation support landscape, especially in areas such as regulatory translation, ESG and data-driven decision-making, circular supply-chain coordination, and sector-specific implementation support. It also outlines a comprehensive instrument and incentive package, as well as a strengthened DIH/ASP service portfolio, to address these gaps and facilitate SME adoption.

Based on these insights, the report proposes a set of strategic pathways for RIS3 scale-up, including the deployment of test-before-invest mechanisms, the use of public procurement as a market driver, the integration of digital enablers for circularity and compliance, and the development of interregional cooperation models for scaling innovation across value chains.

In conclusion, D2.4.3 offers a practical and scalable framework for embedding circular and digital transition within regional innovation ecosystems. It provides guidance for policymakers and ecosystem actors on how

to move from pilot activities to systemic transformation, ensuring that circular economy principles become an integral part of regional competitiveness, innovation performance and long-term sustainability.

3. Audience

This document is directed at all project partnership members, because all members of the partnership should participate in WP2 ideation and implementation, more specifically A2.4 through this report. It should be considered an internal document, and the appropriate status should be reflected in the "Dissemination Level" table.

4. Change Control Procedure & Structure

PP3&6/PRO&SIIT created this report, and it is under standard project change control, whereby PPs are requested to give feedback on the stated definition or tools in writing to the deliverable responsible (here PP3&6/PRO&SIIT) in a timely manner (within 8 working days according to the Rules of Procedure). As per normal procedure, at any time partners believe a project methodology should change, the request should be brought to the work package or work stream leader and Lead Partner (in this case KPT/LP, Project Management Lead and TUKE/PP10, the STRATLAB WP2 Leader) to consolidate feedback from other partners, and integrate and disseminate the final agreed changes. A new version of the document should be created, and recorded in the document's "Document History" table.

Contents

B. Introduction & Purpose of the document

1. Background and the Project overview

SMART CIRCUIT's objective is to champion DIH network & actor's role to fast-track the uptake of digital/tech driven CircEc to enable a resource-efficient & competitive transition in CE manufacturing.

The project is structured as follows:

- WP1 CAPACITIES! Creates enhanced, circular capacities across central Europe digital innovation hub (DIH) eco-systems, to better implement policies and promote an uptake of circularity in Industry through the establishment, validation & expansion of the CIA Solution.
- WP2 LEVERAGE! develops, tests & expands a permanent transnational policy/strategy solution in the Strategy Lab (STRATLAB), to reduce implementation barriers and help diverse TGs leverage access (processes and finance) to innovative circular solutions and services.
- WP3 UPGRADE! design, pilot and roll-out service-solutions (1 system, 4 DIH Solution Portfolios) to the CE Manufacturing Eco-System, to create shared value and permanently upgrade CE production value-chains with digital/tech driven circular economy services and support.

The STRATLAB aims to create multi-directional dialogue between DIHs, manufacturing enterprises and policy makers in the aim to reduce implementation barriers & leverage opportunities for public & private investment to advance circular uptake in industry. The STRATLAB promotes an exchange of information to broker mutual understanding & collective approaches to reduce implementation barriers & leverage investment in circular solutions.

The purpose of the STRATLAB is to:

1. A2.2 BUILD! sets a capacity baseline and engagement pool with 36 policy makers (3/PP) from CE local, regional and national CE manufacturing value-chains. This pool is interviewed on challenges, needs and perceptions regarding circular economy and policy options (D2.2.2).
2. A2.3 TEST! puts A2.2 into action by bridging together triple-helix stakeholders together via DIH-ecosystem into 12 regional strategy-learning labs (SSLs) and 1 transnational lab connecting and showing CE policy makers success stories from other territories.
3. A2.4 EXPAND! uses and further expands lessons and tangible outcomes of the pilot (2.3) to a permanent regional multidirectional platform, a dialogue open space where to bridge Circular to RIS3 strategies and promote optimal integration of EU industrial and digital strategies and CEAP, EU Circular Economy Action Plan, into regional ecosystem.

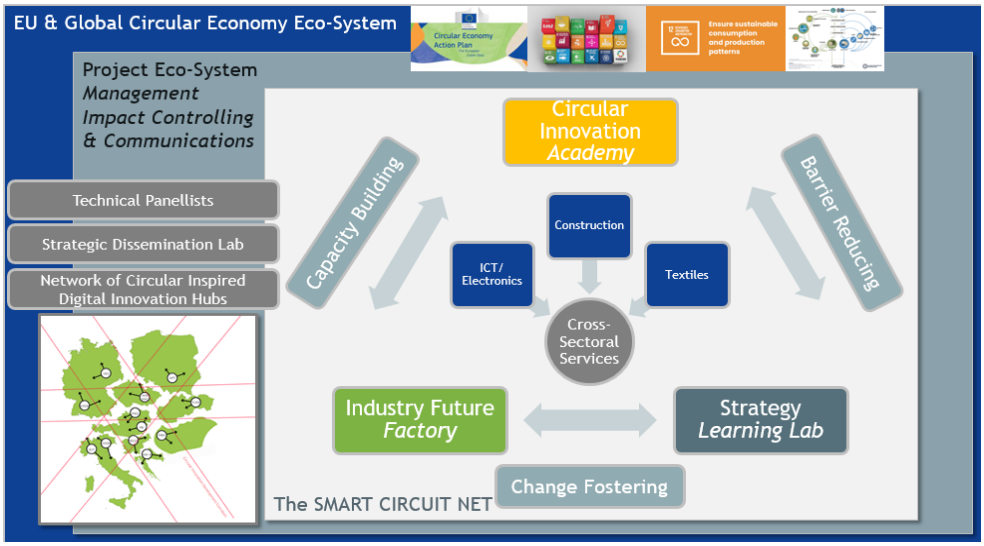

Figure 1 | SMART CIRCUIT Eco-System Overview (source: Project Generated, 2023)

WP2 is led by PP10/TUKE and aims to build, test, implement and expand a permanent transnational policy/strategy solution in the Strategy Lab (STRATLAB), to reduce implementation barriers & help diverse TGs leverage access (processes & finance) to innovative circular solutions & services. A2.4, sets a Roll-Out to Implement Circular Policies & Bridge Territory/Strategy Gaps through Smart Specialisation Synergies. WP2 impact translates directly in the communication Work Stream A2.4: EXPAND! Transnational Circular Industry Futures Strategy Lab Solution: Roll-Out to Implement Circular Policies & Bridge Territory/Strategy Gaps through Smart Specialisation Synergies.

WP2 activities directly linked to two key project result:

1. Circular Industry Futures Strategy Lab (STRATLAB, Result 3) is linked to OT2.1 (Pilot) & OT2.2 (Solution) & vertically embedded in the project plan via AT2.2, AT2.3 & AT2.4 (& evaluated in AT2.5). The STRATLAB is a solution aimed at bridging a key strategic gap between policies/strategies addressing circular economy & digital industry (EU Industrial Strat & Digital Decade, the Green Deal + EU CEAP + connected work programs in HE, DEP). STRATLAB is a transparent forum of responsible stakeholders who address/implement these policies & promotes a method for reducing barriers & leveraging opportunities at the intersect of these policies (e.g. through optimised use of policy instruments & collective accountability in private & public partnership cooperation). The scaled Solution is a connected set of regional (w/ transnational impulses) multi-stakeholder forums to generate synergies in circular economy policy/regulation adoption to research & innovation smart specialisation strategies.
2. Central Europe Circular Industry Futures 2030 Strategy & Action Plan (Result 5), which is linked to OT2.3 & OT1.1, & vertically & horizontally integrated in the work plan in AT2.2, AT2.3, AT2.4 & AT1.1 (&evaluated in AT2.5, with the STRATLAB). This lasting, joint strategy provides the blueprint for policy/industry engagement & permanent brokerage via the transnational DIH-ecosystem. It provides both regional & transnational plans to foster collaboration & use project results to set thematic & instrument recommendations for future-oriented growth & creation of shared value (CSV) in CE's manufacturing eco-system. It fosters the strategy to deliver: ongoing capacity building efforts, barrier reduction & investment leverage & close-the-loop services for key production value chains critical to CE's achievement of key climate & resource-use targets. It builds strategic connections to regional RIS3 + demonstrates sustainability through practical steps (rooted capitalised initiatives, incl. AT3.4 Flagships).

The Figure below provides insights on the STRATLAB design and implementation.

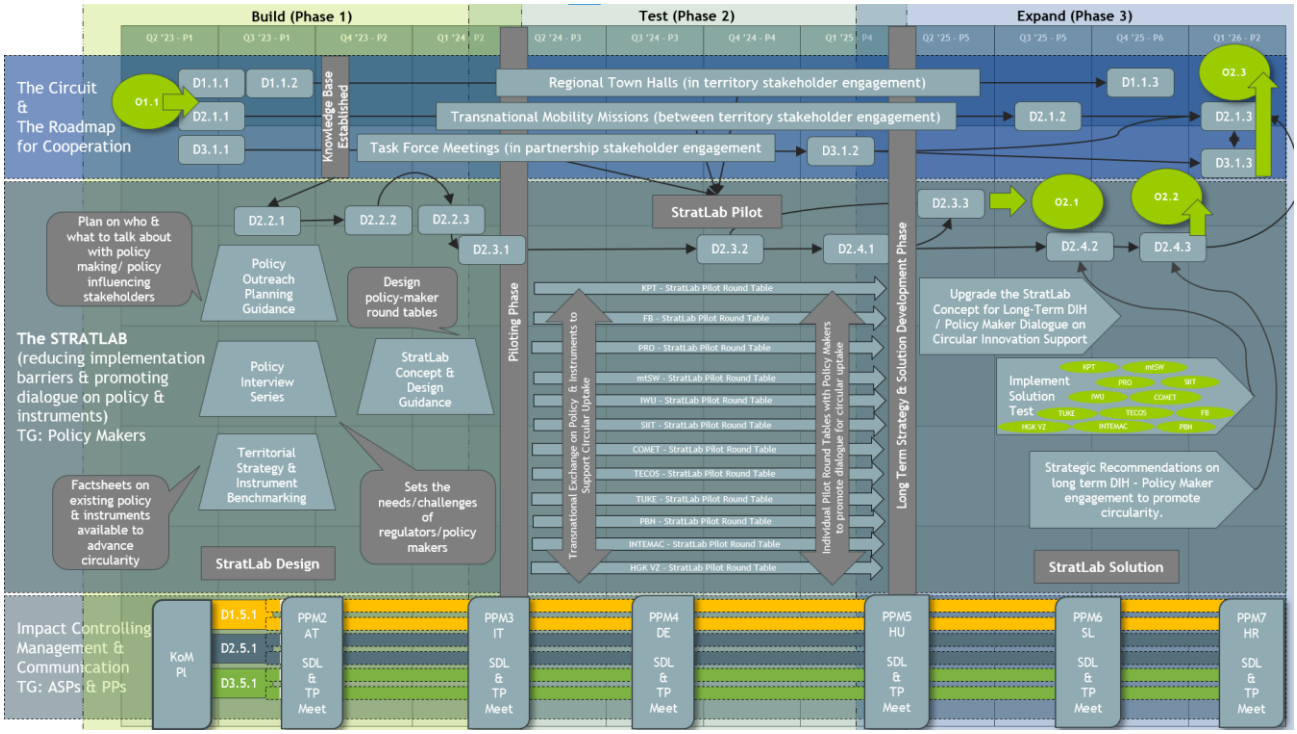

Figure 2 | Plan-on-a-Page for STRATLAB (source: Project Generated, 2023)

WP2 outputs are the following ones:

- The Strategy Learning Lab (STRATLAB) "Exchange & Leverage" Pilot, 1 Transnational System (12 Units) Implemented to Help Policy Makers understand Circular Industry Opportunities & hear TG needs.
- The Circular Industry Futures Strategy Lab (STRATLAB) Solution: Policy-Industry Brokerage for Long-Term Engagement on Bridging Territory & Strategy Gaps.
- CENTRAL EUROPE CIRCULAR INDUSTRY FUTURES 2030: Transnational Strategic Roadmap & Action Plans for Sustainable Roll-out of Service Solutions & DIH Brokerage.

This project context provides the basis for the following sections, which first define the strategic rationale of a RIS3 Circular Focus and then explain how EU-level circular economy and innovation priorities can be translated into regional smart specialisation logic.

2. Strategic intent & scope for RIS3 Circular Focus

2.1. Strategic Rationale of the RIS3 Circular Focus

The strategic intent of a RIS3 Circular Focus is to position circular economy transformation not as a peripheral environmental objective, but as a core pathway for regional innovation, industrial modernisation and long-term competitiveness. In the logic of Smart Specialisation, the purpose is not to support circularity in a generic or purely normative sense. Rather, it is to identify those domains in which a region has credible knowledge assets, industrial capabilities, entrepreneurial actors and institutional capacity, and to use these strengths to generate new circular products, processes, business models and value chains with measurable economic, environmental and social effects.

Within this framework, a RIS3 Circular Focus should be understood as a mission-oriented regional transformation agenda. Its strategic purpose is to accelerate the shift from linear production and consumption models towards regenerative, resource-efficient and low-waste systems in those value chains where the region can realistically demonstrate leadership or competitive differentiation. Circularity is therefore not limited to recycling or waste management. It encompasses eco-design, materials substitution, repair and remanufacturing, product-service systems, industrial symbiosis, digital traceability, secondary raw material markets, circular bioeconomy solutions and collaborative business models that keep value in the regional economy for longer.

The strategic rationale is twofold. First, a RIS3 Circular Focus can increase regional resilience and competitiveness by reducing resource dependency, strengthening the capacity of firms to respond to emerging regulatory and market requirements, and enabling the development of higher-value products and services. Second, it can translate circular transition into concrete innovation opportunities for SMEs and regional value chains. In this sense, sustainability objectives are pursued not only through compliance, but through productive transformation, investment readiness and innovation-led competitiveness.

A crucial strategic implication follows from this. A RIS3 Circular Focus should not be reduced to isolated pilot projects with weak system effects. It should organise a coherent portfolio of activities around a clear transformation logic: identifying regional circular opportunity areas; mobilising firms, universities, clusters, public authorities and intermediaries through entrepreneurial discovery; supporting experimentation and validation; strengthening adoption conditions through skills, infrastructure, standards and market readiness; and enabling scale-up within and across regional value chains. The quality of the strategy therefore depends on whether it creates cumulative transformation effects rather than a fragmented collection of green innovation initiatives.

In this sense, a circular RIS3 approach is strongest when it connects place-based specialisation with system-level coordination. It should help regions define where circularity can become a credible source of competitive advantage, how SMEs and value chains can be supported in the transition, and which conditions are needed for circular solutions to move from experimentation to wider adoption.

2.2. Circular Transition as a Place-Based Innovation Priority

Circular transition becomes strategically relevant for RIS3 when it is embedded in the specific industrial, technological and institutional context of a region. A place-based circular innovation priority does not attempt to circularise every sector at once. Instead, it identifies a limited number of high-potential areas where circular solutions can generate combined effects: resource efficiency, emission reduction, SME upgrading, new market opportunities, value-chain integration and stronger territorial resilience.

This selectivity is important because regions differ in their economic structures, knowledge bases and innovation capacities. In a manufacturing region, circular specialisation may focus on advanced materials

recovery, remanufacturing, resource-efficient production or industrial symbiosis in metalworking and machinery value chains. In a construction-oriented region, the focus may lie on secondary materials, modular building components, digital material documentation, circular procurement or construction and demolition waste valorisation. In a textile region, circularity may be linked to fibre traceability, eco-design, repair, reuse and take-back systems. In an ICT/electronics context, priorities may include repairability, component recovery, digital product information, remanufacturing and e-waste reduction.

The strategic logic remains the same across these different contexts: circularity must be embedded where the region already has sufficient productive, scientific and entrepreneurial density to create traction. A RIS3 Circular Focus should therefore build on existing strengths while opening pathways for transformation. It should not simply replicate EU-level thematic lists, but translate them into territorially credible innovation domains.

This also means that circular transition should be treated as both an environmental and an economic development priority. It can help firms reduce dependency on virgin materials, respond to changing customer expectations, anticipate regulatory requirements and create new business models. At the same time, it can help regions strengthen innovation ecosystems, improve collaboration between public and private actors, and connect local capabilities to wider European value chains.

A place-based circular innovation priority therefore provides the bridge between broad European transition goals and concrete regional action. It defines where circularity is most relevant, which actors need to be mobilised, and where targeted support can create the strongest transformation effects..

2.3. Intervention Scope: What Will Be Tested and Scaled

The scope of a RIS3 Circular Focus should be defined in terms of what types of circular solutions are being tested, in which value chains, and under what conditions they can move from experimentation to scale. In practical terms, the strategy should test and support innovations that improve resource productivity, extend product life, recover value from by-products and end-of-life materials, and create new forms of collaboration between producers, users, repair actors, recyclers, technology providers and public authorities.

At the level of innovation content, a RIS3 Circular Focus can cover five broad intervention domains:

1. **Circular product and process innovation**

   This includes eco-design, modular design, safe and sustainable materials, low-waste production methods, product durability, design for disassembly and technologies that reduce the use of virgin materials.

2. **Circular business model innovation**

   This includes leasing, sharing, product-as-a-service models, take-back systems, repair services, remanufacturing, reverse logistics and new service-based approaches that extend product lifetimes and retain value.

3. **Digital and data-enabled circularity**

   This includes material passports, traceability systems, digital twins, AI-supported resource optimisation, lifecycle data systems and platforms that match waste streams or by-products with secondary use opportunities.

4. **Industrial symbiosis and cross-sectoral valorisation**

This includes the use of one firm's by-product as another firm's input, cross-sector material exchange, secondary raw material markets, shared infrastructure and regional resource-flow coordination.

5. **Skills, standards and market uptake**

   This includes capacity-building, technical standards, sustainability data, procurement readiness, certification, advisory services and market acceptance mechanisms that allow circular innovation to move beyond demonstration.

These domains show that a RIS3 Circular Focus is not only about testing technologies. It is about testing the conditions under which circular innovation becomes feasible, investable and adoptable in real industrial and regional contexts.

The scope should therefore cover different levels of maturation. At the first level, circular solutions must be tested for technical feasibility: whether a new material, process, product redesign, traceability tool or recovery technology works under realistic conditions. At the second level, they must be tested for business viability: whether the solution creates economic value, reduces risk, opens new markets or strengthens customer relationships. At the third level, they must be tested for system compatibility: whether standards, logistics, procurement rules, skills, data systems and value-chain relationships allow the innovation to function in practice. At the fourth level, they must be prepared for adoption and diffusion across firms, clusters, territories and interregional networks.

This staged understanding of intervention scope is essential. If circular RIS3 remains limited to pilot activity, it may produce useful demonstrations but limited structural change. If it connects experimentation with validation, adoption and diffusion, it can influence firm behaviour, supplier relations, skill profiles, investment decisions and regional competitive positioning.

2.4. Target Groups and Beneficiaries: SMEs, Clusters and Value Chains

The primary beneficiaries of a RIS3 Circular Focus are SMEs and the regional value chains in which they are embedded. This emphasis is central because SMEs face simultaneous pressures from rising resource costs, tightening sustainability regulation, changing customer expectations, digital transition and limited internal capacity for transformation.

For SMEs, circularity should not be framed as an additional reporting burden. It should be presented as a route to innovation-led competitiveness. Many SMEs do not have the specialised staff, testing facilities, design capabilities, market intelligence or financial resources needed to manage complex sustainability transitions on their own. A RIS3 Circular Focus can therefore help reduce transition risk by providing access to knowledge, networks, demonstrators, shared infrastructures, pilot environments, advisory support and collaboration opportunities.

However, circular transformation is rarely achieved by isolated firms. It usually requires coordination across value chains and ecosystems. Circular business models depend on suppliers, manufacturers, logistics actors, repair services, recyclers, digital solution providers, public buyers and end users. A product can only become circular if design decisions, material choices, tracking systems, use patterns, take-back channels and end-of-life recovery mechanisms are aligned.

For this reason, the relevant unit of intervention is often the network rather than the individual enterprise. RIS3 circularity should therefore support clusters, consortia and inter-firm collaboration, especially where SMEs can capture value by participating in stronger regional and interregional networks. Clusters and intermediary organisations play a particularly important role because they can translate broad strategic

priorities into operational collaboration formats, identify shared barriers, and connect firms with research, technology, finance and policy actors.

This also explains why circular RIS3 has a strong transnational dimension. Circular value chains frequently exceed administrative borders. Secondary materials, specialised repair markets, advanced recycling technologies, digital traceability systems and pilot infrastructures often require scale beyond one region. A successful RIS3 Circular Focus is therefore local in its knowledge base, but open in its collaboration model. It should strengthen regional capabilities while enabling participation in wider European circular innovation ecosystems.

2.5. Defining Success by 2030

Success by 2030 should be defined as the point at which the RIS3 Circular Focus has moved from project-based experimentation to visible, measurable and self-reinforcing structural transformation in the targeted regional economy. Success should therefore not be measured only by the number of funded projects, workshops or participating organisations. It should be assessed through a balanced set of outcomes that reflect innovation performance, SME transformation, value-chain circularity, ecosystem capacity and territorial positioning.

First, success by 2030 should mean that the region has developed a stable portfolio of circular innovation domains in which it is recognised as competitive and distinctive. This requires evidence that entrepreneurial discovery has produced a workable set of priorities and that these priorities have led to repeated investment, project continuation and ecosystem commitment rather than one-off experimentation.

Second, success should mean that SMEs in the targeted value chains have adopted circular innovation at meaningful scale. This includes the introduction of circular products, circular process improvements, take-back schemes, repair or remanufacturing services, digital traceability systems, resource-efficiency measures and industrial symbiosis arrangements. The relevant benchmark is not only how many firms are involved, but how deeply circularity becomes embedded in their business models, operations and investment decisions.

Third, success should mean that selected value chains have become more integrated and less linear. In practical terms, this includes greater use of secondary materials, stronger by-product valorisation, improved product life extension, reduced material losses and stronger collaboration among firms, intermediaries and knowledge actors. Circularity should become part of normal competitive strategy rather than an external sustainability add-on.

Fourth, success should include improved innovation system performance. A RIS3 Circular Focus should contribute to stronger regional capabilities in collaborative R&D, advanced technology uptake, skills, testing infrastructure, knowledge transfer, cluster coordination and business innovation. This is particularly important because circular transformation depends on the capacity of the whole ecosystem, not only on the motivation of individual firms.

Fifth, success should mean that the region has strengthened its interregional and European positioning. This includes participation in interregional partnerships, access to pilot and scale-up finance, integration into European circular value chains, and collaboration through European innovation initiatives and programmes. In this sense, circular RIS3 should help the region convert local assets into European relevance.

Finally success by 2030 should also be visible in environmental and societal outcomes. These may include reduced dependence on virgin materials, lower waste generation, higher reuse and recovery rates in targeted streams, lower lifecycle emissions in selected value chains and better quality employment linked to circular transition. These outcomes should not be treated separately from innovation and competitiveness, but as part of the same transformation logic.

2.6. Pathways from Pilot Actions to Systemic Scale-Up

A RIS3 Circular Focus should create a pathway from pilot actions to systemic scale-up. This means that circular innovation should move through a structured progression: from exploration, to experimentation, to validation, to adoption, and finally to broader diffusion across value chains and territories.

At the exploration stage, regions identify circular opportunity areas and mobilise stakeholders through entrepreneurial discovery. This phase is important for understanding where circularity has strategic relevance, which value chains are most promising, and what barriers prevent firms from acting.

At the experimentation stage, firms and ecosystem actors test circular solutions in controlled or small-scale settings. This may include product redesign, process optimisation, traceability tools, circular business models, resource-flow mapping or collaborative pilots. The aim is to generate practical learning and reduce uncertainty.

At the validation stage, circular solutions are tested under realistic industrial, market and organisational conditions. This phase examines whether a solution is technically feasible, economically viable and compatible with existing value-chain structures, regulatory requirements and skills capacities.

At the adoption stage, the focus shifts from proof of concept to wider use by SMEs, clusters and value-chain actors. This requires attention to skills, finance, procurement, standards, advisory support and market readiness.

At the scale-up stage, circular solutions become embedded in broader regional and interregional ecosystems. This is where pilot actions connect to investment, industrialisation, policy learning, public-private cooperation and transnational collaboration.

By 2030, a successful RIS3 Circular Focus will have enabled the targeted region to become a demonstrably stronger circular innovation ecosystem in which SMEs and value chains test, adopt and scale circular solutions that improve competitiveness, reduce material dependency, generate new business opportunities and position the region within wider European innovation networks.

This success can be translated into five measurable dimensions:

1. **Innovation and experimentation**

   The region should show a sustained pipeline of circular pilots, demonstrators, collaborative R&D actions and market-oriented innovation projects in its selected RIS3 priority domains.

2. **SME transformation**

   A growing share of SMEs in the targeted value chains should implement circular product, process or business model innovations and report concrete effects on cost structure, market access, resilience or competitiveness.

3. **Value-chain circularity**

   The selected value chains should show measurable increases in reuse, repair, remanufacturing, side-stream valorisation and use of secondary materials.

4. **Ecosystem capacity**

   The region should strengthen entrepreneurial discovery, cluster coordination, skills, testing infrastructure, intermediation and public-private collaboration around circular transition.

5. **Territorial and European positioning**

The region should improve its participation in cross-regional and EU-level initiatives and become more visible as a specialised node in circular innovation networks.

2.7. Concluding synthesis

The strategic intent and scope of a RIS3 Circular Focus should be understood as the selective organisation of regional innovation efforts around circular transformation opportunities that can realistically be tested, adopted and scaled by SMEs and their value chains. Its purpose is not to make the region broadly greener in an unspecific sense, but to create targeted pathways through which circularity becomes a source of innovation, industrial renewal and territorial resilience.

A robust RIS3 Circular Focus will succeed only if it moves beyond symbolic commitment and builds the real conditions for transition: technological validation, business model experimentation, ecosystem coordination, market uptake and interregional connection. By 2030, success should mean that circularity has become embedded in the innovation behaviour of SMEs, in the structure of selected value chains and in the competitive identity of the region itself.

In this way, a circular RIS3 ceases to be a policy intention and becomes a practical model of regional transformation.

3. EU policy-to-RIS3 translation map by 2030

3.1. Purpose of the translation map

A central challenge in Smart Specialisation implementation is that European Union policy priorities are often formulated at a high strategic level, while RIS3 implementation must operate through concrete regional choices, institutional coordination mechanisms, innovation priorities and project pipelines. A policy-to-RIS3 translation framework is therefore needed to bridge the distance between broad EU ambitions and territorially embedded action.

In the context of the 2030 horizon, this translation is particularly relevant because regions are expected to align their smart specialisation priorities with the green and digital transitions, industrial resilience, circular economy objectives, SME competitiveness, skills development and interregional collaboration. A RIS3 with a circular focus must therefore connect European policy directions with the specific industrial, technological and institutional conditions of a region.

For a circular RIS3, the translation task is not merely administrative. It is strategic. Regions must determine how overarching EU objectives such as circularity, sustainable products, industrial transition, digitalisation, innovation ecosystems and resource efficiency can be transformed into a limited number of regionally credible priority domains. These priority domains must then be connected to actions that are feasible for SMEs, clusters, public authorities, Digital Innovation Hubs, research organisations and other ecosystem actors.

In this sense, the translation framework is both a governance logic and an implementation bridge. It helps ensure that RIS3 priorities are not abstract thematic labels, but operational pathways through which EU policy intent becomes actionable at territorial level. It also helps clarify how circular economy priorities can be embedded in regional innovation systems without becoming disconnected from firm-level needs, value-chain realities and investment conditions.

By 2030, such a framework should enable regions to move from passive policy alignment to active strategic positioning. In practical terms, this means selecting those EU priorities that are most relevant to the regional industrial base and innovation ecosystem, identifying related RIS3 domains, and preparing the conditions

for testing, uptake, scaling and interregional connectivity. The purpose of this chapter is therefore to define the policy context and translation logic that underpin the later recommendations of this report.

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3.2. Translation logic: from EU priorities to regional delivery

The logic of translation can be understood as a three-step sequence.

The first step is the identification of EU strategic priorities that are relevant to the region's transformation pathway. These include the European Green Deal, the Circular Economy Action Plan, the Ecodesign for Sustainable Products Regulation, the New European Innovation Agenda, the European Research Area, and ERDF/Cohesion Policy priorities for a smarter and greener Europe. These frameworks define what the Union is trying to achieve by 2030 in terms of sustainability, competitiveness, technological upgrading, circular value creation, innovation capacity and territorial cohesion.

The second step is the definition of RIS3 priority domains. These are not identical to EU priorities. Rather, they are regionalised domains of action shaped by entrepreneurial discovery, existing industrial capabilities, scientific assets, SME needs and territorial opportunity structures. For instance, the EU priority of sustainable products may translate regionally into advanced materials, circular manufacturing, repair systems, secondary raw materials, construction circularity, packaging innovation, textile traceability or bio-based product design, depending on the regional economic profile.

Smart Specialisation therefore does not require regions to copy EU thematic priorities directly. It requires them to interpret these priorities through their own productive and innovation structures. The key question is not only "Which EU priorities are relevant?", but "Where can this region credibly act, differentiate itself and generate measurable transformation effects?"

The third step is the connection of these regionalised domains with implementation pathways. This is where strategic alignment becomes more than formal policy coherence. Implementation pathways may include experimentation, demonstrators, living labs, pilot lines, cluster collaboration, test-before-invest services, skills programmes, public procurement, digital infrastructure, regulatory support, interregional partnerships and scale-up finance. The quality of RIS3 implementation by 2030 will depend not only on whether regions name the right priorities, but on whether they can connect these priorities to the right actors, value chains, instruments and governance mechanisms.

This three-step logic can be summarised as follows:

1. **EU strategic priority**

   What does the European policy framework aim to achieve?

2. **Regional RIS3 translation**

   Which regional strengths, value chains and innovation domains can make this priority actionable?

3. **Implementation pathway**

   Which mechanisms, actors and support structures are needed to move from priority-setting to experimentation, adoption and scale-up?

For SMART CIRCUIT, this translation logic is especially relevant because the project operates at the intersection of circular economy, digitalisation, manufacturing transformation, DIH/EDIH service provision and policy learning. The project's added value lies in showing how these dimensions can be connected through regional and transnational innovation ecosystems..

3.3. Key EU Policy Priorities Relevant for a Circular RIS3

The following section outlines the main EU policy priorities that are most relevant for a circular RIS3 by 2030. The aim is not to provide recommendations at this stage, but to define the policy framework that regional actors need to interpret and translate into their own innovation priorities.

3.3.1. Green Deal and Circular Economy Transition

At EU level, the European Green Deal and the Circular Economy Action Plan establish the macro-priority of decoupling economic growth from resource use, reducing waste, improving product sustainability and retaining value in the economy for longer. Circularity is therefore not framed only as an environmental correction, but also as an industrial and competitiveness agenda.

For RIS3, this priority creates a strong rationale for embedding circular economy objectives into regional innovation strategies. It encourages regions to identify where circular transformation can strengthen competitiveness, reduce material dependency, improve resource productivity and create new opportunities for SMEs and value chains. Relevant regional domains may include circular manufacturing, industrial symbiosis, waste-to-resource innovation, remanufacturing, repair ecosystems, secondary raw materials, sustainable packaging, construction material recovery, circular bioeconomy and circular consumer or industrial products.

The key implication for regional strategy is that circularity should not be treated as a separate environmental topic. It should be connected to industrial renewal, SME upgrading, innovation capacity and territorial resilience.

3.3.2. Sustainable Product Policy and ESPR Implementation

The Ecodesign for Sustainable Products Regulation marks an important shift in EU circular economy policy. It strengthens the move towards more durable, repairable, reusable, energy-efficient and resource-efficient products, while increasing the relevance of product information, sustainability data and lifecycle-based design.

For RIS3, this policy direction is highly relevant because it affects how firms design, manufacture, document and commercialise products. It creates a stronger need for eco-design capability, sustainable materials engineering, product durability, reparability, digital product information, circular compliance services, design for disassembly and product-service systems.

Regions with strong manufacturing, design, engineering, furniture, textile, construction, electronics or materials capabilities can use this policy context to define circular innovation niches. The strategic relevance lies in helping regional firms move from reactive compliance towards anticipatory innovation. By understanding sustainable product policy early, SMEs and value chains can prepare for future market requirements and potentially create first-mover advantages.

3.3.3. SME Competitiveness and Smart Economic Transformation under ERDF

The ERDF framework places smart economic transformation at the centre of regional development. It supports research and innovation capacity, advanced technologies, digitalisation, SME competitiveness, skills for smart specialisation, industrial transition, entrepreneurship and innovation ecosystem connectivity.

For a circular RIS3, this means that circular transition should be linked directly to SME competitiveness. Many SMEs will only engage with circularity if it is connected to cost reduction, productivity, market access,

regulatory preparedness, resilience or new business opportunities. Therefore, circular economy priorities need to be framed not only as sustainability measures, but as part of a broader competitiveness and innovation agenda.

At regional level, this may translate into domains such as resource-efficient production, digital process optimisation, sustainable materials processing, circular services, repair-based enterprise models, innovation-intensive supplier upgrading and advanced manufacturing for circularity. The important point is that circular transformation should strengthen the economic position of SMEs rather than add complexity without clear business value.

3.3.4. Innovation Ecosystems, Deep Tech and Regional Innovation Valleys

The New European Innovation Agenda places strong emphasis on strengthening innovation ecosystems across Europe, accelerating deep-tech innovation and reducing the innovation divide. Regional Innovation Valleys are particularly relevant in this context because they aim to connect regions with different innovation profiles around shared societal and industrial challenges, including circularity.

For RIS3, this policy priority highlights the importance of interregional cooperation and ecosystem connectivity. Circular value chains often require capacities that exceed the boundaries of one region. Advanced recycling technologies, digital material traceability, bio-based industrial solutions, green chemistry, circular construction ecosystems and resource-exchange platforms may all depend on complementary capabilities across territories.

The strategic implication is that a circular RIS3 should be place-based, but not inward-looking. It should strengthen regional specialisation while also enabling regions to participate in wider European innovation networks. By 2030, the ability to scale circular innovation through interregional partnerships will be an important differentiator between isolated regional experimentation and genuinely European-level smart specialisation.

3.3.5. European Research Area and Knowledge Valorisation

The broader EU research and innovation agenda and the European Research Area emphasise stronger R&I systems, cross-border knowledge circulation, knowledge valorisation and greater impact of research on economic and societal transformation. For circular transition, this is especially relevant because many circular solutions depend on applied research, technical validation, new materials, digital systems and collaboration between research organisations and industry.

In RIS3 terms, this priority translates into the need to connect regional research strengths more directly with industrial and societal application. Relevant domains may include applied materials science, circular biotechnology, industrial digitalisation for resource optimisation, life-cycle assessment, materials recovery technologies, circular design methods, digital traceability and sustainability data systems.

The strategic challenge is to prevent research excellence from remaining disconnected from SME adoption and value-chain upgrading. A circular RIS3 therefore needs strong interfaces between universities, RTOs, DIHs, clusters, SMEs and public authorities. This is where knowledge valorisation becomes a practical requirement for regional transformation.

3.3.6. Industrial Modernisation and Strategic Value Chains

EU-level smart specialisation cooperation also supports interregional collaboration around industrial modernisation and strategic value chains. This is relevant for circular RIS3 because circular transition is not only a matter of isolated eco-innovation; it is also a way to modernise established industrial sectors and reposition them towards resource efficiency, resilience and higher-value production.

For regional strategies, this priority may translate into domains such as circular machinery systems, sustainable mobility components, advanced resource-efficient production, industrial data systems, low-carbon materials, circular agri-food chains, circular construction solutions and sector-specific circular product innovation.

The key implication is that circularity should be linked to industrial transformation. Regions with established manufacturing clusters can use circular RIS3 priorities to reposition existing strengths rather than abandoning them. In this way, circular transition becomes a pathway for modernising strategic value chains and increasing their long-term competitiveness.

3.4. Implications for the Structure of This Report

The translation framework presented in this chapter provides the policy and strategic context for the rest of the report. It explains why circular RIS3 implementation requires a connection between EU-level policy priorities, regional innovation domains, SME needs, DIH/EDIH service provision and transnational cooperation.

The following chapters build on this framework in a stepwise logic. Chapter C presents the evidence base from industry and policy interviews, showing which needs, barriers and opportunities are visible at company and value-chain level. Chapter D then examines how these needs were tested and validated through the STRATLAB process and how SMART CIRCUIT can be understood as an operating model for policy–industry brokerage and circular transition support. Chapter E translates the evidence and validation results into strategic recommendations for regional policy scale-up and transnational synergies.

This structure reflects the overall logic of the deliverable:

1. **Framework and context**

   The EU and RIS3 policy setting for circular transition.

2. **Evidence**

   The needs, challenges and opportunities identified through interviews.

3. **Validation**

   The STRATLAB outcomes and tested service logic.

4. **Recommendations**

   Strategic pathways, instruments and service models for policy scale-up.

5. **Conclusion**

   The core contribution of SMART CIRCUIT to circular and digital transition in regional innovation ecosystems.

In this way, the policy-to-RIS3 translation framework serves as the conceptual bridge between the strategic context and the later recommendations. It ensures that the report remains anchored in EU policy priorities while still focusing on practical regional implementation, SME adoption and transnational scale-up.

C. Evidence Base: Strategic Outcomes of Industry and Policy Interviews

4. Approach and Rationale of the Industry Interviews

The Industry Interview / Audit Series was conceived as a diagnostic and action-oriented exercise. It was not designed as a generic survey on sustainability, but as a structured baseline audit intended to capture real industrial needs, constraints and ambitions regarding circular economy transition. Its purpose was threefold: first, to understand how enterprises perceive circular economy barriers and opportunities; second, to identify where digital and technology-driven solutions can realistically accelerate circular transition; and third, to translate this evidence into practical clustering, service design and action planning for the Circular Industry Factory (FACTORY) implementation pathway in WP3.

Within the SMART CIRCUIT architecture, WP3 “UPGRADE!” aims to bring enterprises to “see and feel” the value-creation potential of digital and technology-driven circular services. This requires moving circularity beyond abstract policy principles and translating it into concrete business, technology and investment opportunities. The interviews therefore provide an evidence base for designing service portfolios and pilots that enterprises are more likely to adopt. They help clarify what companies perceive as barriers, what they recognise as opportunities, and what they consider feasible in the short to medium term, including investment constraints, regulatory uncertainty, skills shortages and supply-chain limitations.

A second rationale is comparability across territories. SMART CIRCUIT operates in Central European contexts with diverse industrial ecosystems, policy settings and market dynamics. The interviews were therefore designed not only to generate local intelligence for each Project Partner, but also to create a harmonised evidence base that allows cross-sectoral and cross-country patterns to be identified. This supports coordinated pilot choices, transnational service clustering and a stronger common understanding across the consortium.

A third rationale is that circular transition is multidimensional and cannot be captured through a single yes/no measure of circularity. The interview results are therefore interpreted through complementary conceptual lenses, including circular maturity and barriers-and-enablers logic. This makes it possible to understand both where companies currently stand and what types of support could move them forward. The interviews do not only capture what companies say they need; they also help identify the structural conditions that influence whether circular solutions can be adopted in practice.

5. Methodological Approach

A core methodological choice was the use of open-ended questions. This allowed interviewees to explain their practices, perceptions and constraints in detail, recognising that circular transition is qualitative, context-dependent and difficult to capture through pre-defined answer categories alone. The resulting dataset was therefore treated through qualitative analysis, especially thematic analysis, combined with basic quantification for synthesis and visualisation.

The interview guide was designed to explore both circular transition and the role of digital and technology-driven solutions in enabling it. Digitalisation was not treated as an add-on, but as a potential enabler for bridging the circularity gap. Digital and technological tools may help mitigate specific barriers, for example through supply-chain traceability, compliance monitoring, lifecycle assessment, resource optimisation or improved access to circular business models. This is why the interviews included dedicated questions on the

usability of digital and technology-driven solutions and on sectoral trends related to digital circular transition.

The target group consisted of enterprises operating in the Textile, Construction and ICT/Electronics sectors, while also allowing for additional sectors in order to capture cross-sectoral and regionally specific value chains. The interviews included participation from nine countries: Austria, Hungary, Germany, Slovenia, Slovakia, Italy, Croatia, the Czech Republic and Poland. In total, the dataset comprises 62 enterprises, distributed across the three priority sectors and a broader "other sectors" category.

This targeting logic served two purposes. First, it ensured sufficient depth in the project's main Task Force sectors: Textile, Construction and ICT/Electronics. Second, it enabled cross-sectoral learning by identifying barriers and opportunities that are relevant beyond one sector or territory. This is particularly important for SMART CIRCUIT because circular transition requires both sector-specific support and transnational cooperation across diverse regional ecosystems.

6. Priority Domains and Value-Chain Transformation Pathways

The interview results show that circular transition needs differ across sectors, but also reveal several recurring patterns. Across the dataset, enterprises repeatedly highlight the importance of regulatory clarity, financial support, skills development, digital tools, market awareness and ecosystem coordination. The following sectoral synthesis summarises the main needs, challenges and takeaways for Construction, Textile, ICT/Electronics and cross-sectoral value chains.

6.1. Construction

6.1.1. Needs

Construction companies require ecosystem support that enables them to adopt circular practices without undermining project feasibility, cost-efficiency or market acceptance. The main needs relate to knowledge sharing and networking, including the development of local clusters or consortia, regulatory guidance, education and training, financial incentives and consultancy services. Companies also emphasise the need for support in choosing and implementing the right technologies. DIHs can play an important role by providing access to training platforms, technology expertise and practical demonstrations. Digital and automation solutions are seen as particularly relevant where they can help address workforce shortages, improve safety and increase productivity.

6.1.2. Challenges

The main barriers in the construction sector are customer and market readiness, financial constraints and technology integration. These challenges were reported by more than 60% of companies. Regulatory standards and regulatory uncertainty affect around 50%, while workforce challenges affect around 40%. Additional barriers include waste management, reducing environmental impact and improving resource efficiency. More specifically, companies refer to market unreadiness, customer resistance, financing difficulties, the complexity of integrating advanced technologies into existing workflows, frequent regulatory changes, limited legal clarity around modular construction and practical constraints in recycling composite materials or sorting construction waste.

6.1.3. Main takeaways

Construction companies identify sustainability-driven opportunities mainly through resource efficiency, followed by circular design and practices, new business opportunities and waste reduction. Implementation is strongly linked to digital and technology-driven enablers such as BIM, IoT, robotics, LCA tools and material monitoring. At the same time, companies stress that technology alone is not sufficient. Market uptake also depends on customer education, supportive public procurement and policy instruments that reward circularity and lifecycle value rather than lowest upfront cost.

6.2. Textile

6.2.1. Needs

Textile companies require capacity-building to anticipate regulatory change and operationalise circularity through traceability, customer engagement and circular product design. A central need is access to a stable source of information on current and upcoming regulations, standards and legal requirements at national and international levels. Companies highlight the value of digital platforms that provide current requirements, upcoming timelines and clear guidance on actions to be taken. This should be complemented by consultancy services and direct regulatory guidance where clarification is needed.

In addition, textile companies require support for collaboration and networking, education and training, financial incentives, market awareness, consultancy services, waste management and supply-chain integration. These needs are especially relevant for enabling secondary material flows, take-back systems, circular design and compliance with emerging product and sustainability requirements.

6.2.2. Challenges

The main challenge for the textile sector is regulatory compliance and regulatory change, identified by 80% of interviewed organisations. Economic challenges follow at 70%. Customer preferences and market trends, as well as resource management challenges, affect around 60%. Integration of advanced technologies, quality assurance and supply-chain collaboration each affect around 50%. Additional barriers include market acceptance, competition, workforce capacity and business model adaptation.

6.2.3. Main takeaways

Textile companies identify market expansion and customer acquisition as the most prominent opportunity. Progress in the sector is closely linked to traceability, transparency and customer communication. Relevant digital solutions include blockchain-enabled traceability, resource-tracking platforms, tools for authenticity and certification, digital platforms for visibility and customer loyalty, circular design software and take-back systems. Companies also refer to the importance of regulatory developments such as REACH, the Green Claims Directive, carbon-related requirements, open data standards for tracing materials and products, and mandatory textile collection. Overall, textile circularity depends on a combination of compliance readiness, traceability infrastructure, customer awareness and circular product design capability.

6.3. ICT/Electronics

6.3.1. Needs

ICT/Electronics companies require de-risked investment support, stronger compliance readiness and digital or technology adoption pathways aligned with sustainability goals. Their needs include financial incentives, such as tax breaks and support for sustainable technologies and high material recovery, as well as collaboration and partnership initiatives, R&D cooperation, innovation hubs, regulatory guidance, public awareness programmes and market communication. Many companies report limited awareness of current and upcoming regulations on electronic waste reduction and management. They therefore need proactive information, employee training and practical assistance on how to adapt to future requirements.

6.3.2. Challenges

The predominant challenge in the ICT/Electronics sector is cost management and initial investment, reported by 65% of companies. This is followed by technological innovation and integration at 59%. Customer acceptance, market dynamics and competitiveness affect 47%, while stakeholder engagement and regulatory compliance remain additional challenges. Circular practice implementation, cybersecurity risks and supply-chain disruptions are also mentioned. Qualitatively, companies refer to legal complexity, evolving environmental regulations, packaging requirements, obsolescence and risks connected to scaling solutions from laboratory or pilot settings into real market applications.

6.3.3. Main takeaways

Opportunities in ICT/Electronics are strongly operational. Resource efficiency and resource management are the leading opportunity areas, followed by customer awareness, market expansion and waste reduction. Circular design, closing-the-loop approaches and collaboration are also important. These opportunities are connected to advanced technologies such as IoT for tracking product use, repair and recycling needs; blockchain for traceability and sourcing transparency; AI and machine learning for resource optimisation and energy reduction; and digital twins for simulation and process optimisation. The sector therefore shows strong potential for digital circularity, provided that technology adoption is linked to investment support, compliance readiness and realistic business cases.

6.4. Cross-Sectoral Findings

6.4.1. Needs

At cross-sectoral level, companies require policy and ecosystem support that reduces regulatory uncertainty, de-risks investments and accelerates capability building. Financial incentives emerge as the most important type of public support, identified by 59% of companies. This is followed by networking and collaboration opportunities, training and education, public awareness activities and assistance in formulating policy and regulatory frameworks.

Open digital platforms and consultancy services are seen as practical mechanisms for providing compliance information, guidance and access to relevant actors. Companies also emphasise the need for education and training events, as well as more structured engagement with policymakers to ensure that regulatory frameworks remain aligned with market realities and implementation capacities.

6.4.2. Challenges

The most significant cross-sectoral challenge is regulatory change and compliance, reported by 53% of companies. This is followed by unstable market dynamics at 50% and technology dynamics, adaptation and obsolescence at 40%. Additional barriers include lack of qualified workforce and training, insufficient cooperation, limited participation in EU-funded collaboration, sustainable supply-chain management, resource constraints, customer awareness, financial limitations, environmental challenges and competitiveness pressures.

6.4.3. Main takeaways

The cross-sectoral findings show that circular transition requires organisational change, not only technological improvement. Companies need to embed circularity into organisational culture, business models, internal responsibilities and performance measurement. While 74% of companies report having an official circular strategy, they focus on an average of only 3.5 out of 9 strategy elements, indicating that strategies are often partial rather than comprehensive.

Measurement and governance remain weak. Only 26% of companies have defined circular indicators, and only 11% have a Circular Transition Manager. Circular maturity also remains limited: no company is classified as integrative or regenerative; 10% have not developed circular practices, 22% are at a basic level, 39% are explorative and 29% are systematic. This indicates that most companies are aware of circular transition but still need support to formalise, deepen and operationalise it.

Digital and technology-driven solutions are identified as key enablers for bridging the circularity gap. Platforms can support information sharing and networking; blockchain, IoT and AI can support supply-chain transparency and optimisation; and LCA platforms can help companies assess environmental impacts and make better investment decisions. However, these tools need to be embedded in broader support structures that include finance, skills, regulation, market access and policy–industry coordination.

6.5. Synthesis of the Evidence Base

The industry and policy interview evidence points to a clear conclusion: circular transition in Central European manufacturing is not constrained by one single barrier. Instead, companies face a combination of regulatory uncertainty, investment risk, limited skills, fragmented supply chains, market hesitation and uneven access to digital and technological support.

Across all sectors, enterprises require support that is practical, sector-specific and connected to business realities. They do not only need awareness-raising on circular economy principles. They need concrete services that help them understand regulation, access finance, test technologies, build internal capabilities, measure circular performance, cooperate across value chains and bring circular solutions to market.

The evidence also confirms the importance of DIHs and related ecosystem intermediaries. DIHs can support companies by linking technology expertise with training, pilot facilities, funding guidance, regulatory orientation and networking. However, the findings suggest that DIHs need to go beyond generic digitalisation support. They need to act as circular transition brokers that connect digital solutions with compliance, investment readiness, organisational change and value-chain collaboration.

These findings provide the evidence base for the following chapter. The STRATLAB process builds on the needs and barriers identified through the interviews and tests how policy–industry dialogue, DIH service portfolios and transnational learning can help validate and operationalise the circular transition support model.

D. Validation and Operating Model: STRATLAB Outcomes and SMART CIRCUIT Scale-Up Logic

7. STRATLAB Method and Policy-Learning Cycle

7.1. Rationale of the STRATLAB Approach

Within the SMART CIRCUIT framework, STRATLABs are designed as structured policy-learning and validation environments. Their purpose is to create multi-directional dialogue between Digital Innovation Hubs, manufacturing enterprises, policymakers, research and technology organisations, business support organisations and other ecosystem actors. This dialogue is not an end in itself. It is intended to reduce implementation barriers, identify opportunities for public and private investment, and support the practical uptake of circular and digital solutions in manufacturing value chains.

The STRATLAB approach responds to a clear implementation gap. On the one hand, policymakers need a better understanding of territorial readiness, enterprise needs, digital infrastructure requirements, investment barriers and the effectiveness of existing policy instruments. On the other hand, SMEs and industrial actors need clearer regulatory guidance, financial support, training, consultancy, market orientation and access to practical digital and circular services. STRATLABs are positioned at the intersection of these two needs pools.

A central assumption of SMART CIRCUIT is that DIHs and related ecosystem intermediaries can act as mediators between companies and policymakers. They can translate policy priorities into practical support services and, at the same time, translate company needs into policy intelligence. The STRATLABs provide the setting in which this mediation role is tested, discussed and validated with stakeholders.

The STRATLAB concept therefore goes beyond a workshop format. It functions as a policy–industry brokerage mechanism. It enables stakeholders to test service ideas, discuss barriers, validate support needs and identify future cooperation pathways. It also helps position DIHs within regional ecosystems as actors that can support circular transition, not only through digital technology services, but also through regulatory orientation, skills development, financing guidance, matchmaking and strategic dialogue.

An additional function of the STRATLAB approach is transnational learning. The labs bring external policy and strategy experiences into regional ecosystems and allow policymakers and ecosystem actors to compare methods, instruments and good practices from other territories. This creates opportunities for transfer, adaptation and scale-up across Central Europe.

7.2. STRATLAB Methodology

The STRATLAB methodology was developed as a structured, consortium-wide process to ensure that all Project Partners could implement Activity A2.3 in a comparable way. This was important because the results of the regional STRATLABs needed to be synthesised at transnational level and used as a foundation for scale-up under A2.4.

The methodology follows three main phases.

Phase 1: Design and Preparation of Regional STRATLABs

The first phase focused on designing and preparing the 12 Regional Strategy Learning Labs. Each STRATLAB was treated as a learning-by-doing pilot that had to be evidence-based, service-oriented and comparable across regions.

Partners first reviewed the relevant evidence base, including barriers and readiness factors identified by policymakers and support needs expressed by SMEs. This evidence was then translated into a territorial focus for each lab. The aim was to ensure that STRATLAB agendas were not generic, but linked to concrete regional needs.

On this basis, each Project Partner and its associated DIH defined a service portfolio to be presented and tested during the STRATLAB. Services were selected from common service families such as training, networking, best-practice showcasing, guidance on instruments and finance, digital tools and platforms, and technology consulting. These services were mapped against the needs of both policymakers and SMEs.

The methodological requirement was that the selected services had to be testable within the STRATLAB setting. In other words, they needed to be feasible, relevant to the target audience, understandable for stakeholders and suitable for future replication or continuation.

Partners also defined the target groups and event format. STRATLABs were designed to convene triple-helix and, where relevant, quadruple-helix stakeholders through the DIH ecosystem. This ensured that policy discussion remained connected to implementation realities and market constraints.

Phase 2: Implementation and Reporting of Regional STRATLABs

The second phase consisted of implementing the regional STRATLABs. Each partner embedded its selected services into the event agenda and tested them with stakeholders.

A typical STRATLAB sequence included:

1. an introduction and framing of the circular transition challenge;
2. presentation or demonstration of selected DIH services;
3. structured dialogue with stakeholders;
4. workshop or roundtable formats for co-creative problem-solving;
5. networking and follow-up discussion to strengthen trust and continuity.

The focus was not only on presenting project results, but on generating stakeholder feedback. Partners captured key discussions, service reactions, additional requests and suggestions for improvement. Where appropriate, short surveys or structured feedback templates were used to collect comparable information.

After each event, partners submitted a standardised STRATLAB report. These reports captured the tested service portfolio, stakeholder feedback, additional service needs, event structure, participant types, key takeaways and proposed follow-up topics. This created a shared evidence base for transnational synthesis.

Phase 3: Transnational Consolidation and Policy Learning

The third phase focused on transnational consolidation. Regional outputs were compared, cleaned and analysed in order to identify recurring patterns, territorial differences, service gaps and opportunities for scale-up.

The synthesis of the STRATLABs contributed to the refinement of the DIH service portfolio and to the development of policy and strategic recommendations. A dedicated transnational panel supported the dissemination and validation of results, the exchange of best practices and the further definition of the DIH role in long-term policy learning.

Through this process, STRATLABs became more than regional events. They became a structured policy-learning cycle that connects evidence, service testing, stakeholder validation and strategic scale-up.

8. STRATLAB Outcomes and Recommendations

The 12 regional STRATLABs generated a broad evidence base on how DIHs, EDIHs and associated ecosystem actors can support circular transition in manufacturing. While the regional contexts differed, several common patterns emerged: stakeholders need practical and low-threshold services, clearer regulatory guidance, support in accessing finance, stronger capacity-building, more concrete best-practice examples, and recurring formats for policy–industry dialogue.

The following synthesis summarises the main outcomes and recommendations from the regional STRATLABs.

8.1. HGK VZ – DIH Connect

The STRATLAB implemented by HGK VZ with DIH Connect validated an LCA-oriented service offer as a practical digital support tool for assessing environmental impacts across the product or service life cycle. Stakeholders confirmed the relevance of LCA for compliance-oriented decision-making and for structuring sustainability actions.

At the same time, participants highlighted the need for more hands-on guidance and capacity-building to ensure that SMEs can apply LCA methods effectively. The event also confirmed demand for actionable tools, guidelines and training related to sustainable business models and digital transformation.

The main recommendation is to expand LCA training modules, provide step-by-step implementation guidance and focus future STRATLAB activities on skills for green and digital jobs, regulatory frameworks and funding opportunities.

8.2. PROFACTOR – EDIH AI5production

The PROFACTOR STRATLAB with EDIH AI5production validated the relevance of low-threshold “test-before-invest” services for SMEs. Stakeholders particularly valued quick feasibility checks, simplified programming approaches and flexible automation support because these reduce administrative burden and investment risk.

The STRATLAB also produced an operational outcome by identifying companies for an individual pilot and initiating the definition of a concrete use case. This shows that STRATLABs can move beyond dialogue and directly support pilot development.

The main recommendation is to formalise the selection and onboarding pathway for pilot companies, strengthen advisory support on funding and investment potential, and structure future STRATLAB agendas around financing instruments and adoption pathways.

8.3. INTEMAC – EDIH-DIGIMAT

The INTEMAC STRATLAB with EDIH-DIGIMAT generated outcomes related to ESG readiness, practical guidance and awareness-raising. Stakeholders confirmed that unbiased guidance and practical orientation are essential, especially because ESG pressures already arise through supply chains, customer expectations and finance-related requirements, even where formal reporting obligations are still limited.

Participants requested specialised workshops on ESG reporting procedures, data collection, data quality and organisational roles related to sustainability responsibilities.

The main recommendation is to broaden stakeholder participation, including national policymakers, and to deepen practical support on how to start with ESG implementation. Future activities should include company cases, best practices, ISO 14001, scope 3 challenges and digitalisation-enabled waste reduction.

8.4. COMET – EDIH IP4FVG

The COMET STRATLAB with EDIH IP4FVG strengthened policy–SME dialogue and validated consultation workshops and trend-watching services as useful tools for policy design. The event helped make SME needs more visible and supported alignment with emerging green and digital trends.

The in-person format enabled cross-sector exchange and demonstrated the value of practical examples, including the model factory visit, in making digital sustainability more tangible. Stakeholders highlighted the need for clearer communication channels, more tailored SME support and simplified access to funding.

The main recommendation is to institutionalise regular roundtables and workshops, develop platforms for showcasing success stories and structure future STRATLABs around financial frameworks, scalable digital tools for circular adoption and comparative learning on regulatory and support instruments.

8.5. PBN Association – am-LAB

The STRATLAB implemented by the Pannon Business Network Association with the am-LAB DIH confirmed that digital skills are a prerequisite for digitally driven circular transition. SMEs require tailored, practical support to understand and apply available tools.

The offline event enabled exchange between local government, academia, business associations and SMEs. It confirmed that cross-sector collaboration and continuous education mechanisms are needed beyond one-off initiatives. Interactive formats were especially useful for translating concepts into practice and shaping future cooperation.

The main recommendation is to expand the service portfolio through mentorship schemes connecting SMEs with experts, implement webinars on industry-specific digital trends and deepen cooperation with universities for continuous learning pathways. Future STRATLABs should strengthen networking, international participation and funding-related support for SME digital transformation.

8.6. Fraunhofer IWU – Circular Saxony

The Fraunhofer IWU STRATLAB under the Circular Saxony framework produced outcomes centred on best-practice exchange, network activation and design-oriented approaches to circular transition. The event used success stories, project initiation support and futures/scenario methods to stimulate strategic reflection.

Stakeholders confirmed the value of implementable examples and identified product design as a key challenge affecting the economic feasibility of circular strategies. A limitation was the non-involvement of creative-industry representatives, which was identified as an improvement point.

The main recommendation is to adjust invitation strategies, involve creative industries through targeted outreach and refine the long-term service offer. Future STRATLABs should prioritise regulation-to-action guidance, funding routes and design-for-circularity cases.

8.7. Krakow Technology Park – Hub4Industry

The Krakow Technology Park STRATLAB with Hub4Industry focused on structured capability building through an academy approach, readiness pre-audits, focus group interviews, board-level interviews, tailored webinars, study visits and financial-instrument consultancy.

The event enabled discussion on green and digital solutions and confirmed that digital transformation and circularity are strongly interconnected. However, the absence of SME representatives limited direct insight into business-side needs and reduced the robustness of conclusions for SMEs.

The main recommendation is to organise a follow-up STRATLAB explicitly involving both SMEs and policymakers, strengthen SME outreach and incentives for participation, and use structured feedback loops to improve the service portfolio. Future activities should prioritise training, upskilling, funding access and regulatory or standardisation support.

8.8. SIIT – DIH Liguria

The SIIT STRATLAB with DIH Liguria aimed to bridge bottom-up SME needs with top-down policy frameworks through a co-creation approach. The hybrid event used a World Café methodology and confirmed that direct SME–policy interaction is valuable and should become more structured and recurrent.

The policy advocacy and support service was perceived as a growth enabler, especially when combined with tailored guidance on frameworks and funding opportunities. Stakeholders also requested sustained collaboration mechanisms and policy impact tracking with measurable KPIs.

The main recommendation is to develop a digital matchmaking tool and a policy-impact monitoring instrument, expand the co-creation offer to include EU funding submission support, and introduce stronger sectoral focus and interactive policy simulation. Future STRATLABs should integrate structured matchmaking and case-based policy guidance.

8.9. TECOS d.o.o. – TECOS DIH

The TECOS STRATLAB produced outcomes strongly oriented towards implementation support for circular product development. It emphasised fast prototyping and material or process optimisation as ways to improve resource efficiency.

Stakeholders confirmed that rapid validation is a critical enabler for SMEs pursuing circular products. They also highlighted the importance of voucher-like financial mechanisms to reduce cost barriers for prototyping and circular validation. The event reinforced that circular practices are increasingly relevant in electronics due to material scarcity and that cross-border cooperation can improve access to prototyping resources and expertise.

The main recommendation is to refine prototyping-oriented services with clearer eligibility and delivery pathways, explore voucher schemes and strengthen international collaboration models. Future STRATLABs

should focus on funding mechanisms, digitalisation as a circularity accelerator and best practices in material recovery and recycling.

8.10. TUKE – EDIH Cassovium

The TUKE STRATLAB with EDIH Cassovium produced an initial consolidation of the STRATLAB format in a context where comparable engagement settings are less common. The event combined initiative presentations, regional engagement models and a dedicated feedback session.

The main outcome was an "ice-breaking" effect between SMEs, policymakers and DIH actors. The event enabled a clearer mapping of constraints to DIH service categories and created a more realistic understanding of feasible synergies. However, concrete portfolio updates were not reported at this stage.

The main recommendation is to embed future STRATLABs as co-organised components within larger regional events to expand outreach, establish explicit procedures for structured feedback and translate this feedback into service updates. Future activities should focus on financing, capacity limitations and market access with clearly testable service demonstrations.

8.11. Forschung Burgenland – DIH Süd / DIH Ost / EDIH

The Forschung Burgenland STRATLAB presented consultancy-oriented DIH services for integrating digitalisation and circular economy, complemented by the Circular Innovation Academy as a capacity-building asset. Stakeholders assessed the offer positively and highlighted that circular innovation is attractive but cost-intensive.

Additional requests included stronger dissemination of circular economy benefits, improved accessibility of materials, including information in German, more best-practice examples, clearer information on CO_2 savings in relation to supply-chain requirements and a "climate fitness test" type service.

The main recommendation is to strengthen communication materials, translate and tailor CIA content for local uptake, enrich the portfolio with best-practice cases and measurable impact narratives, and define an actionable financing guidance module. Future STRATLABs should report implemented follow-up actions and deepen discussion on funding and infrastructure enablers.

8.12. microTEC Südwest – Zentrum Klima.Neutral.Digital

The microTEC Südwest STRATLAB focused on regional service coordination and capacity-building for climate-neutral and digital transformation. The service landscape included a learning network within SMART CIRCUIT, climate coaching, collaboration platforms, DIH services and support roles such as a Green Deal guide.

Stakeholders expressed interest in bundling and coordinating support across providers. Discussions among service organisations were productive, and participants requested that best-practice examples be presented with greater operational detail. A limitation was the lack of policymaker participation, which constrained the intended policy-facing dialogue.

The main recommendation is to shift future STRATLABs to an offline format, engage policymakers earlier through targeted invitations and ensure strong agenda relevance for public actors. The learning network concept should be translated into concrete workshops at company sites, with an emphasis on tangible cooperation formats, detailed best practices and measurable next steps for SMEs.

9. SMART CIRCUIT Operating Model for Scale-Up

9.1. From STRATLAB Results to an Operating Model

The STRATLAB outcomes show that circular transition support requires more than isolated training, consultancy or technology demonstration. Stakeholders across regions repeatedly ask for integrated support that connects digitalisation, regulation, funding, skills, market development, ESG readiness and policy coordination. This indicates the need for an operating model that can structure long-term support beyond individual events.

The SMART CIRCUIT operating model for scale-up is based on four connected functions:

1. Evidence generation

   Needs, barriers and opportunities are identified through interviews, audits, stakeholder dialogue and regional analysis.

2. Service validation

   DIH and EDIH service offers are tested with stakeholders through STRATLABs, workshops, demonstrations and feedback sessions.

3. Policy–industry brokerage

   Enterprises, policymakers, DIHs, clusters, research organisations and support actors are brought into structured dialogue to translate needs into policy and service responses.

4. Scale-up and institutionalization

   Validated approaches are embedded in regional service portfolios, RIS3 processes, transnational cooperation mechanisms and future project or funding pipelines.

This operating model reflects the central contribution of SMART CIRCUIT: the project does not only generate recommendations, but tests how circular transition support can be organised through existing innovation ecosystems.

9.2. Brokerage as a Reference Architecture

A central outcome of SMART CIRCUIT is the positioning of brokerage as a structuring function within regional and transnational innovation ecosystems. Brokerage refers to the capacity to connect policy objectives, industry needs, digital solutions and circular transition pathways into coherent, actionable frameworks.

Within the project, this brokerage role is operationalised through the STRATLAB and the DIH ecosystem. Together, they create a reference architecture for policy–industry interaction and circular innovation support. Rather than focusing only on dialogue, this approach translates discussions into structured service portfolios, tested interventions and replicable implementation pathways.

Brokerage is important because circular transition is inherently systemic. It requires coordination between firms, policymakers, technology providers, financiers, research actors, clusters, public authorities and end users. No single actor can deliver circular transformation alone. The brokerage function ensures that these actors are connected and that fragmented needs are translated into coordinated responses.

The SMART CIRCUIT brokerage architecture combines four dimensions:

1. Technical validation

   Testing and demonstration of circular and digital solutions, including test-before-invest services, pilots and practical use cases.

2. Organisational adaptation

   Support for skills, processes, business models, circular strategies, internal responsibilities and transition management.

3. Regulatory alignment

   Translation of regulatory requirements into actionable guidance, including compliance, reporting, standards and policy feedback.

4. Ecosystem coordination

   Value-chain collaboration, matchmaking, stakeholder dialogue, cluster cooperation and transnational learning.

These dimensions show that brokerage should not be understood as informal networking. It is a functional layer that helps regions connect strategic priorities with concrete implementation mechanisms.

9.3. Role of Local Operational Centres

A key component of the SMART CIRCUIT operating model is the role of Local Operational Centres (LOCs). LOCs act as implementation nodes within regional ecosystems. They provide a practical interface between SMEs, technology providers, research actors, policymakers and support organisations.

Their function is not limited to coordination. LOCs support concrete experimentation, validation and service delivery. In particular, they can enable:

1. demonstration activities and pilot actions linked to circular use cases;
2. test-before-invest services that allow SMEs to experiment with digital and circular solutions;
3. access to infrastructure, technical expertise and advisory support;
4. connection to funding instruments, innovation programmes and follow-up opportunities;
5. structured feedback between companies and policy actors.

This model builds on existing DIH and EDIH approaches, where test-before-invest has proven effective in reducing adoption risks. Within SMART CIRCUIT, however, this logic is applied more explicitly to circular transition challenges such as traceability, eco-design, resource optimisation, LCA, ESG readiness and compliance.

LOCs therefore provide a practical mechanism for moving from strategic discussion to implementation. They help ensure that circular RIS3 priorities are translated into services and pilot actions that firms can actually access.

9.4. From Pilot Actions to Scalable Ecosystem Support

The SMART CIRCUIT operating model shows that pilot actions should not be treated as isolated experiments. They should be connected to a broader scale-up pathway. This means that pilots, STRATLABs and service tests need to feed into longer-term ecosystem development.

The scale-up logic can be described in five steps:

1. **Identify needs and barriers**

   Evidence is collected through interviews, audits and stakeholder engagement.

2. **Translate needs into service offers**

   DIHs and ecosystem actors define service portfolios that respond to identified barriers.

3. **Test services through STRATLABs and pilots**

   Services are demonstrated, discussed and validated with stakeholders.

4. **Refine and institutionalise service models**

   Feedback is used to improve services and embed them into DIH, cluster or regional support structures.

5. **Connect regional models to transnational cooperation**

   Validated approaches are shared across territories and linked to broader European initiatives, funding opportunities and RIS3 cooperation.

This scale-up logic is particularly relevant for circular transition because many solutions require cross-regional cooperation. Secondary material flows, specialised testing infrastructure, digital traceability systems and circular value chains often extend beyond one region. SMART CIRCUIT therefore provides a model that is regional in implementation but transnational in learning and scaling.

10. Sustainability Beyond the Project Duration

The long-term impact of SMART CIRCUIT depends on its ability to move from a project-based initiative to a sustained operating model embedded within regional and transnational innovation structures. The project's Letter of Commitment provides a foundation for this transition by outlining how partners will continue to apply, transfer and develop the three core solution systems: CIA, STRATLAB and FACTORY.

A first dimension of sustainability is the continuation of service provision and capacity-building activities. The Circular Innovation Academy can remain available through partner platforms and networks, ensuring ongoing upskilling of professionals, SMEs and ecosystem actors. DIHs and associated organisations can continue integrating training, advisory and test-before-invest services into their regular activities, thereby extending the reach of project results into everyday practice.

A second dimension is the institutionalisation of policy–industry dialogue. STRATLAB is not intended as a one-off format, but as a repeatable method for structured engagement between policymakers, industry and innovation actors. Partners can continue participating in regional strategy forums, thematic workshops and transnational exchanges, using STRATLAB principles to maintain alignment between policy objectives and implementation realities.

A third dimension is the integration of circular and digital services into DIH and cluster ecosystems. Several partners can embed SMART CIRCUIT tools and methodologies into existing service portfolios, including

advisory services, training programmes, pilot environments and innovation support schemes. This ensures that project outputs are not isolated results, but become part of a broader and evolving support landscape for SMEs.

The continuation of pilot activities and demonstration environments is also important. The Circular Industry Factory concept provides a basis for ongoing experimentation, allowing partners to further develop service models, test new solutions and support SMEs in applying circular and digital approaches in practice. This continuity is essential for maintaining momentum after the formal project period.

A further element is transnational cooperation. Continued collaboration among partners, regular exchanges, joint participation in events and the development of new project initiatives can help scale results, share knowledge and align strategies across regions.

In practical terms, SMART CIRCUIT can support future development through:

1. integration of project results into follow-up EU-funded projects;
2. alignment with RIS3 strategies and regional innovation agendas;
3. continued engagement with DIH, EDIH and cluster networks;
4. further development of circular and digital service models;
5. continuation of pilot activities, training formats and policy-learning mechanisms;
6. development of new flagship solutions and interregional cooperation pipelines.

Taken together, these mechanisms indicate that SMART CIRCUIT is not designed as a temporary intervention, but as a foundation for ongoing ecosystem development. Its long-term value lies in embedding circular and digital transition within existing regional structures while maintaining the flexibility to adapt to evolving policy frameworks, market conditions and technological developments.

11. Synthesis of the Validation and Operating Model

The STRATLAB process validates the central assumption of SMART CIRCUIT: circular transition requires structured brokerage between policy, industry, digital innovation actors and regional ecosystems. The regional STRATLABs show that stakeholders value practical services, clear regulatory orientation, access to finance, training, best-practice examples, pilot opportunities and recurring policy–industry dialogue.

At the same time, the STRATLABs demonstrate that DIHs and EDIHs can play a broader role than conventional digital service providers. They can become circular transition brokers that connect technology adoption with regulatory readiness, ESG and sustainability data, circular business model development, funding support and value-chain cooperation.

The SMART CIRCUIT operating model therefore provides a bridge between evidence and recommendations. Chapter C identified the needs and barriers experienced by companies and value chains. Chapter D has shown how these needs were validated through STRATLABs and translated into an operating model for scale-up. The following chapter builds on this foundation and formulates strategic recommendations for regional policy scale-up and transnational synergies.

E. Strategic Recommendations for Regional Policy Scale-Up and Transnational Synergies

12. Recommendation Logic: From Evidence and Validation to Scale-Up

The strategic recommendations in this chapter build on the logic developed in the previous sections of the report. Chapter B defined the strategic and policy framework for a RIS3 Circular Focus. Chapter C presented the evidence base from industry and policy interviews, showing the needs, barriers and opportunities experienced by enterprises and value chains. Chapter D validated these findings through the STRATLAB process and translated them into a SMART CIRCUIT operating model for scale-up.

The purpose of Chapter E is to convert this framework, evidence and validation into strategic recommendations for regional policy scale-up and transnational synergies. The recommendations are not intended as isolated policy measures. They are designed as a coherent package that links circular economy priorities with regional innovation strategies, DIH/EDIH service provision, SME adoption, policy–industry brokerage and interregional cooperation.

The overall recommendation logic is based on five principles.

First, circular RIS3 implementation should be selective and place-based. Regions should identify those circular transition domains where they have credible industrial strengths, knowledge assets, entrepreneurial capacity and ecosystem readiness. Circularity should not be treated as a generic policy label, but as a focused transformation pathway connected to specific value chains.

Second, circular transition should be framed as a competitiveness and innovation agenda for SMEs. The evidence from the industry interviews shows that companies are more likely to engage with circularity when it is connected to cost reduction, market access, regulatory readiness, resource efficiency, investment de-risking and new business opportunities.

Third, policy scale-up requires a portfolio of instruments rather than a single support measure. Circular solutions need different forms of support at different maturity stages: exploration, experimentation, validation, adoption and systemic scale-up. A strong RIS3 approach should therefore combine vouchers, demonstrators, test-before-invest services, finance instruments, procurement, regulatory support, skills development and interregional cooperation.

Fourth, DIHs, EDIHs, clusters and associated service providers should be positioned as circular transition brokers. Their role should go beyond digital technology adoption. They should connect digital solutions with circular business models, ESG readiness, regulatory guidance, funding access, value-chain matchmaking and policy feedback.

Fifth, transnational cooperation should be integrated into the scale-up logic from the beginning. Many circular value chains, technologies and material flows exceed regional boundaries. Regions should therefore use RIS3 priorities as anchors for interregional partnerships, joint demonstrators, shared pilot infrastructures and participation in European initiatives.

On this basis, the following sections outline thematic policy-to-RIS3 pathways, instrument packages, governance implications, service portfolio recommendations and digital enablers for circular policy scale-up.

13. Thematic Policy-to-RIS3 Pathways for Circular Scale-Up

To make the EU policy-to-RIS3 translation framework operational, regions need thematic pathways that connect European policy drivers with regional innovation domains and concrete implementation directions. These pathways help ensure that circular RIS3 does not remain at the level of broad ambition, but becomes actionable for policymakers, SMEs, DIHs, clusters and other ecosystem actors.

The following thematic pathways are particularly relevant for SMART CIRCUIT-type ecosystems.

13.1. Circular Products and Eco-Design

The main EU policy drivers for this pathway are the Circular Economy Action Plan and the Ecodesign for Sustainable Products Regulation. Together, they increase the importance of durable, repairable, reusable, resource-efficient and better-documented products. For regions, this creates a clear opportunity to connect sustainable product policy with RIS3 priorities in manufacturing, design, materials, textiles, electronics, furniture, construction and related value chains.

At RIS3 level, this pathway translates into priority domains such as eco-design, circular product engineering, advanced materials, design for disassembly, product durability, reparability, product traceability and sustainable manufacturing services.

Recommended implementation directions include:

1. design and eco-design support for SMEs;
2. prototyping and product redesign labs;
3. material testing and validation facilities;
4. design-for-disassembly demonstrators;
5. advisory services on circular product requirements;
6. cooperation platforms connecting firms with universities, designers, DIHs and material experts.

The strategic objective is to help regional firms move from reactive compliance to anticipatory innovation. Eco-design should therefore not be understood only as a regulatory requirement, but as a way to strengthen product quality, market positioning and long-term competitiveness.

13.2. Secondary Raw Materials and Industrial Symbiosis

The second thematic pathway concerns secondary raw materials, by-product valorisation and industrial symbiosis. The EU policy driver is the circular economy objective of keeping resources in use for longer and creating value from industrial residues, waste streams, by-products and end-of-life materials.

At RIS3 level, this translates into domains such as material recovery, industrial symbiosis, waste valorisation, recycling technologies, circular construction materials, secondary input markets and regional material-flow coordination.

Recommended implementation directions include:

1. regional material-flow analysis;
2. by-product and secondary-material exchange platforms;
3. industrial symbiosis brokerage services;
4. demonstration projects for recovered materials;
5. pilot investments in sorting, preprocessing, reuse or recovery infrastructure;
6. regulatory guidance for the safe and compliant use of secondary materials.

This pathway is particularly relevant for manufacturing regions, construction ecosystems, agri-food areas and territories with significant industrial residues. It can create both environmental and economic value by reducing material losses, lowering dependence on virgin inputs and strengthening regional value-chain integration.

13.3. SME Upgrading and Circular Business Models

The third pathway links circular transition with SME competitiveness and business model innovation. The main EU policy driver is ERDF support for SME competitiveness, entrepreneurship, smart specialisation, digitalisation and industrial transition.

At RIS3 level, this translates into domains such as circular service models, product-service systems, leasing, repair and maintenance businesses, remanufacturing, low-waste production, digital monitoring for asset life extension and resource-efficient manufacturing.

Recommended implementation directions include:

1. SME circular transition audits;
2. circular innovation vouchers;
3. mentoring and coaching for business model redesign;
4. test-before-invest services linked to circular use cases;
5. access-to-finance and investment-readiness support;
6. circular accelerator programmes;
7. capacity-building modules for internal transition management.

The evidence from the interviews shows that many SMEs already recognise circularity as relevant, but often lack the internal capacity, indicators, staff roles and financial resources to implement it systematically. SME upgrading should therefore focus not only on technologies, but also on organisational readiness, business viability and market adoption.

13.4. Digital Circularity and Compliance Readiness

A fourth pathway concerns digital enablers for circularity and compliance. Circular transition increasingly depends on data: product information, lifecycle documentation, traceability, ESG reporting, material composition, environmental performance and supply-chain transparency.

At RIS3 level, this translates into domains such as digital product information, material passports, traceability systems, lifecycle assessment, ESG data architecture, digital twins, AI-supported resource optimisation and compliance monitoring.

Recommended implementation directions include:

1. digital traceability pilots;
2. LCA and ESG data support services;
3. SME guidance on sustainability data collection;
4. digital product information readiness checks;
5. demonstrators for material passports or product lifecycle data;
6. integration of digital tools into circular business models.

This pathway is important because it connects digital innovation directly with circular economy implementation. It also strengthens the role of DIHs and EDIHs, which are well positioned to help firms test digital tools, assess maturity and integrate technology into operational processes.

13.5. Interregional Scaling and Ecosystem Connectivity

The fifth pathway concerns transnational and interregional scaling. The main EU policy drivers are the New European Innovation Agenda, Regional Innovation Valleys, Interregional Innovation Investments and wider European innovation ecosystem initiatives.

At RIS3 level, this pathway translates into domains that require complementarities across territories, such as advanced circular manufacturing, deep-tech circular innovation, circular bioeconomy systems, digital material passports, shared pilot infrastructures, secondary raw material networks and collaborative platforms for circular scale-up.

Recommended implementation directions include:

1. interregional project pipelines;
2. co-funded demonstrators;
3. cluster-to-cluster cooperation;
4. shared pilot and testing infrastructures;
5. common investment agendas;
6. matchmaking around complementary regional specialisations;
7. joint governance structures for cross-border scaling.

This pathway is essential because many circular solutions cannot scale within one region alone. By linking regional RIS3 priorities with complementary capacities in other territories, regions can move from local experimentation to European-level circular innovation ecosystems.

14. Instrument and Incentive Package for RIS3 Scale-Up

A circular RIS3 requires an instrument mix suited to different phases of innovation maturity. The transition from pilot actions to systemic scale cannot rely on one funding call or one type of support. It requires a coordinated package that links innovation support, market creation, regulatory readiness, ecosystem coordination and transnational scale-up.

The recommended instrument package should cover five maturity phases: exploration, experimentation, validation, adoption and systemic scale-up.

14.1. Exploration Instruments

At the exploration stage, regions need to identify circular opportunity areas, mobilise stakeholders and understand where circularity can generate the strongest transformation effects. Appropriate instruments include:

1. entrepreneurial discovery workshops;
2. foresight and market intelligence;
3. circular opportunity mapping;
4. regional material-flow analysis;
5. SME needs assessments;
6. policy–industry dialogue formats;
7. small-scale feasibility grants.

These instruments are useful where circular domains are emerging but not yet consolidated. They help regions avoid generic priority-setting and instead build circular RIS3 around evidence, territorial strengths and stakeholder needs.

14.2. Experimentation Instruments

At the experimentation stage, firms and ecosystem actors need low-threshold opportunities to test circular ideas without taking excessive financial or organisational risk. Appropriate instruments include:

1. circular innovation vouchers;
2. feasibility studies;
3. eco-design checks;
4. LCA screening;
5. digital traceability pilots;
6. rapid prototyping support;
7. test-before-invest services through DIHs and EDIHs.

This stage is particularly important for SMEs, which often lack internal resources for early experimentation. Low-bureaucracy instruments can reduce entry barriers and help firms understand whether a circular solution is technically and economically promising.

14.3. Validation and Demonstration Instruments

At the validation stage, circular solutions need to be tested under realistic industrial, market and organisational conditions. Appropriate instruments include:

1. pilot lines;
2. living labs;
3. shared testing facilities;
4. demonstrator projects;
5. technology extension services;
6. collaborative applied research projects;
7. sector-specific pilot calls.

These instruments are needed when circular solutions are technically promising but not yet ready for broad deployment. They allow firms and ecosystem actors to test operational fit, cost structures, market relevance, regulatory compatibility and value-chain cooperation.

14.4. Adoption and Diffusion Instruments

At the adoption stage, the objective shifts from testing to broader uptake by SMEs, clusters and value-chain actors. Appropriate instruments include:

1. SME advisory services;
2. cluster-led circular transition programmes;
3. training and upskilling modules;
4. procurement support;
5. circular business model coaching;
6. ESG and KPI development support;
7. challenge-based calls encouraging SME–research collaboration.

This stage addresses the practical barriers that prevent firms from integrating circular solutions into everyday operations. Adoption instruments should therefore combine technical guidance with organisational, financial and market support.

14.5. Systemic Scale-Up Instruments

At the scale-up stage, circular solutions need to become economically embedded and connected to wider regional and interregional ecosystems. Appropriate instruments include:

1. blended finance;
2. guarantees and loans for circular investment;
3. strategic public procurement;
4. regulatory alignment support;
5. standardisation support;
6. interregional partnerships;
7. investment platforms;
8. participation in EU ecosystem initiatives.

This stage determines whether circular RIS3 remains project-based or becomes part of a region's long-term competitiveness model. It is also the stage where transnational synergies become most relevant, because scaling often requires cross-regional value chains, shared infrastructures and complementary specialisations.

14.6. Practical Instrument Package for SMART CIRCUIT-Type Regions

For SMART CIRCUIT-type ecosystems, the most relevant package combines five instrument families.

First, regions should establish low-threshold circular transition vouchers for SMEs. These could cover eco-design checks, digital traceability pilots, LCA screening, ESG-readiness support, circular business model advice and prototyping.

Second, regions should develop sector-specific demonstrator calls. In construction, this could support circular procurement, modular design, BIM-enabled material tracking and construction waste valorisation. In textiles, it could support traceability, circular product redesign and take-back models. In ICT/Electronics, it could support repairability, remanufacturing, product information systems and resource recovery.

Third, regions should use public procurement as a market creation tool. Circular criteria, lifecycle costing and innovation-oriented procurement can create demand for circular solutions and help SMEs move beyond pilot projects.

Fourth, regions should establish regulatory support and sandbox functions. These can help SMEs interpret evolving rules, test circular solutions in controlled settings and provide feedback to policymakers on implementation barriers.

Fifth, regions should prepare interregional scale-up pipelines. RIS3 priorities should be used as anchors for participation in Interregional Innovation Investments, Regional Innovation Valleys and other European cooperation mechanisms.

Together, these instruments create a coherent pathway from experimentation to adoption and scale-up.

15. Governance Implications for Circular RIS3 Implementation

The recommendations above also have direct implications for RIS3 governance. Circular transition is systemic by nature. It cuts across sectors, policy areas, funding instruments, regulatory frameworks and value chains. As a result, it cannot be managed effectively through fragmented programmes or isolated project calls.

15.1. EU Policy as a Strategic Resource

First, RIS3 governance bodies should treat EU policy not only as a compliance checklist, but as a strategic resource. Frameworks such as the Green Deal, the Circular Economy Action Plan, the Ecodesign for Sustainable Products Regulation, ERDF priorities and the New European Innovation Agenda provide direction for future markets, regulation and investment. Regions should use these frameworks to anticipate change and position their firms and value chains accordingly.

This requires a regular policy-scanning function within RIS3 governance. DIHs, clusters, regional authorities and research organisations should jointly monitor relevant EU developments and translate them into implications for SMEs, service portfolios, funding priorities and regional innovation domains.

15.2. Repeated Entrepreneurial Discovery

Second, entrepreneurial discovery should be repeated and updated. Circular economy, sustainable product policy, ESG requirements, digital product information and industrial resilience are evolving quickly. RIS3 priorities should therefore not be fixed once and then treated as static. They should be reviewed through recurring dialogue with companies, policymakers, clusters, research actors and intermediaries.

STRATLAB-type formats can support this by creating structured spaces for continuous policy learning. They allow regions to check whether existing priorities still match industrial needs and whether new circular opportunity areas are emerging.

15.3. Monitoring Beyond Project Outputs

Third, monitoring systems should track not only project outputs, but also the quality of transformation. Counting workshops, participants or funded projects is not sufficient. Circular RIS3 monitoring should examine whether circularity is becoming embedded in SME behaviour, value-chain relations, investment decisions, service portfolios and regional innovation governance.

Relevant monitoring dimensions include:

1. adoption of circular products, processes and business models by SMEs;
2. development of circular indicators and transition roles inside companies;
3. increased use of secondary materials and by-product valorisation;
4. number and quality of circular demonstrators and pilots;
5. participation in interregional circular innovation initiatives;
6. integration of circular services into DIH and cluster portfolios;
7. policy changes or funding instruments influenced by stakeholder feedback.

This type of monitoring can support accountability and help avoid the risk that circular transition remains symbolic or project-based.

15.4. Multi-Actor Governance

Fourth, circular RIS3 governance should involve a broad group of actors. Public authorities and research organisations are important, but they are not sufficient. Governance structures should also include manufacturing firms, SMEs, clusters, DIHs, EDIHs, recyclers, designers, financial intermediaries, procurement actors, technology providers and civil society representatives where relevant.

This is necessary because circularity depends on coordination across the full value chain. Eco-design, traceability, repair, reuse, recycling, public procurement and industrial symbiosis each require different actors to work together. Multi-actor governance helps ensure that strategies remain connected to implementation realities.

15.5. Brokerage and Institutional Continuity

Fifth, regions should institutionalise brokerage functions. The SMART CIRCUIT evidence shows that stakeholders need recurring dialogue, translation between policy and industry, and support in connecting services, finance, regulation and implementation. Brokerage should therefore not depend only on temporary project activities.

DIHs, EDIHs, clusters or Local Operational Centres can host this brokerage function, provided they have sufficient mandate, visibility and resources. Their role should include stakeholder convening, service coordination, policy translation, feedback collection, matchmaking and support for interregional cooperation.

The central governance implication is that circular RIS3 needs a permanent coordination layer. Without such a layer, circular policy priorities risk remaining fragmented across funding programmes, sectors and institutions. With such a layer, regions can build a more coherent and scalable circular transition ecosystem.

16. DIH/ASP Service Portfolio for Circular Adoption

The evidence from the industry interviews and STRATLABs shows that the current DIH/EDIH service landscape already provides important foundations for digital transformation, especially through test-before-invest, training, investment support, digital maturity assessment and ecosystem networking. However, SMART CIRCUIT also shows that circular transition requires a broader and more integrated service portfolio.

The key recommendation is to position DIHs, EDIHs, clusters and associated service providers as circular transition brokers. Their role should go beyond generic digitalisation support and connect digital tools with circular business models, regulatory readiness, sustainability data, financing, organisational change and value-chain cooperation.

A strengthened DIH/ASP service portfolio should include the following integrated service lines:

1. **Circular regulatory intelligence and compliance translation**

   DIHs and ASPs should help SMEs understand and anticipate evolving EU and national circular economy requirements. This includes practical guidance on sustainable product policy, traceability, waste management, repairability, environmental claims, ESG-related requirements and sector-specific compliance issues.

2. **Policy-industry brokerage**

   STRATLAB-type formats should be continued as recurring policy–industry dialogue mechanisms. They can collect SME needs, translate them into policy intelligence, and help policymakers, companies and support organisations jointly identify implementation barriers and support measures.

3. **ESG, LCA and circular KPI support**

   Many SMEs lack circular indicators, sustainability data structures and internal measurement systems. DIHs and ASPs should therefore provide support for basic circular KPIs, LCA screening, ESG-readiness checks, data collection and interpretation of sustainability results for business decisions.

4. **Organisational transition support**

   Circular transition requires internal capacity. Service providers should support SMEs through circular maturity assessments, circular action plans, business model redesign, training for management and staff, and coaching for internal transition roles such as Circular Transition Managers.

5. **Circular supply-chain and matchmaking services**

   Circularity depends on cooperation across value chains. DIHs and clusters should support partner search, secondary-material matchmaking, by-product valorisation, supplier cooperation, repair and reuse networks, and cross-border collaboration.

6. **Sector-specific implementation packages**

   Generic support is not sufficient. Construction, textile and ICT/Electronics value chains require tailored circular service packages. These may cover, for example, circular procurement and BIM-enabled material tracking in construction, traceability and take-back models in textiles, and repairability, remanufacturing and e-waste compliance in ICT/Electronics.

7. **Circular validation finance and voucher support**

   SMEs need low-threshold instruments to test circular solutions before committing to larger investments. DIHs and ASPs should support circular innovation vouchers, prototyping vouchers, LCA/ESG vouchers, test-before-invest services and investment-readiness guidance.

8. **Policy impact and accountability support**

   Brokerage should include follow-up and monitoring. Regional ecosystems should track service uptake, recurring barriers, circular pilots, changes in company capabilities, policy feedback and interregional cooperation opportunities.

Together, these service lines expand the current DIH/EDIH market logic. They preserve the strengths of existing digital innovation support while adding the circular, regulatory, organisational and policy-facing dimensions needed for RIS3 scale-up.

17. Digital Enablers for Circularity and Compliance

Digital technologies are a central enabling layer for circular transition. Circularity depends on information: what materials are used, where products move, how long they remain in use, whether they can be repaired or reused, and what recovery options exist at end of life. Digitalisation is therefore increasingly connected to traceability, lifecycle information, ESG data, reporting, compliance and value-chain coordination.

The SMART CIRCUIT evidence shows that companies do not ask for digital tools in abstract terms. They ask for tools that solve concrete problems: tracing materials, preparing for regulation, measuring circular performance, reducing waste, improving resource efficiency and coordinating with partners. The key recommendation is therefore to connect digital adoption directly to circular implementation priorities.

The most relevant digital enablers can be grouped into four functional categories.

1. **Traceability and product information**

   Digital product information, material passports, lifecycle data and traceability systems can support circular design, repairability, compliance and end-of-life management. In textiles, they can support fibre tracking and composition transparency. In ICT/Electronics, they can support repair and recovery. In construction, they can support material documentation and future reuse.

2. **Testing and experimentation**

   Test-before-invest services, pilots and demonstrators allow SMEs to test circular digital solutions before making major investments. This is especially relevant for LCA tools, traceability systems, IoT-based resource monitoring, repair workflow management, waste-stream optimisation and product redesign.

3. **Coordination and matchmaking**

   Digital platforms can support industrial symbiosis, secondary-material exchange, service visibility, partner search and cross-border cooperation. These platforms can start as curated spaces linking material opportunities, support services, funding information and trusted intermediaries, and later evolve into more operational exchange environments.

4. **Performance optimisation**

   AI, robotics, analytics, digital twins and IoT can improve resource efficiency, predictive maintenance, sorting, recovery, production efficiency and waste reduction. These technologies should be introduced through realistic use cases and linked to finance, skills and organisational readiness.

Across all four categories, the central issue is not technology alone. The decisive question is whether SMEs and regional ecosystems can use digital tools in a way that makes circularity easier to implement, finance and scale. Digitalisation should therefore be embedded in circular service portfolios, RIS3 priorities and policy-learning mechanisms.

18. Synthesis: Strategic Pathways for Transnational Synergies

The recommendations in this chapter show that regional policy scale-up and transnational synergies are closely connected. Circular transition must be implemented locally, because SMEs, clusters, public authorities and service providers operate within specific regional ecosystems. At the same time, circular value chains, digital infrastructures, secondary material flows and specialised pilot environments often extend beyond regional and national borders.

SMART CIRCUIT therefore points towards a dual scale-up logic: regions need stronger local implementation capacity, while also using transnational cooperation to access complementary expertise, shared infrastructures and wider value-chain opportunities.

Five strategic pathways are particularly relevant:

1. **Shared circular RIS3 priorities**

   Regions should identify common circular transition domains, such as circular construction, textile traceability, ICT/Electronics repair and recovery, industrial symbiosis, digital product information or circular SME upgrading. Transnational cooperation is strongest when regions contribute complementary capabilities rather than identical profiles.

2. **Joint service development through DIH/EDIH networks**

   DIHs and EDIHs should cooperate across borders to develop joint circular service modules, such as common training materials, LCA or ESG tools, circular maturity assessments, test-before-invest offers, matchmaking formats and regulatory guidance templates.

3. **Cross-border demonstrators and pilot pipelines**

   Transnational cooperation should move beyond knowledge exchange and support concrete demonstrators. Relevant areas include textile traceability chains, construction material reuse, electronics repair and recovery, and industrial symbiosis across neighbouring territories.

4. **Transnational policy learning and brokerage**

   STRATLAB-type formats can be used to compare regional experiences, identify recurring barriers, transfer good practices and connect policymakers, SMEs, DIHs, clusters and research actors across territories.

5. **Common monitoring and impact narratives**

   Regions should track how circular transition progresses across value chains, including SME adoption, circular service uptake, demonstrator development, interregional partnerships, skills development and policy changes influenced by stakeholder feedback.

In this way, transnational synergies can help regions move from isolated pilot activity to wider circular innovation ecosystems.

19. Concluding Synthesis of the Recommendations

The strategic recommendations of this chapter translate the report's framework, evidence and validation results into an integrated scale-up agenda. The main message is that circular RIS3 implementation requires a coordinated support system rather than isolated instruments.

Regions should define thematic circular pathways, deploy instrument packages across different maturity stages, strengthen governance and monitoring, expand DIH/ASP service portfolios and embed digital enablers into practical circular use cases. At the same time, they should use transnational cooperation to connect complementary capabilities, scale pilots, share services and strengthen European positioning.

For SMART CIRCUIT-type ecosystems, the core recommendation is to position DIHs, EDIHs, clusters and Local Operational Centres as circular transition brokers. Their role is to connect policy, industry, digital tools,

finance, regulation and value-chain cooperation. This brokerage function enables circular economy priorities to move from strategic ambition to practical implementation.

Taken together, the recommended pathways provide a scalable model for regional policy scale-up and transnational synergies. They support the transition from project-based experimentation to long-term circular innovation ecosystems that improve competitiveness, reduce material dependency and strengthen Central Europe's role in circular and digital industrial transformation.

F. Conclusions

SMART CIRCUIT demonstrates that circular and digital transition in Central European manufacturing requires more than isolated pilots, individual technology services or general policy commitments. The project shows that effective scale-up depends on the ability to connect policy objectives, enterprise needs, digital solutions, financing instruments and regional innovation strategies into a coherent support system.

The report has followed a clear logic. First, it defined the strategic framework for a RIS3 Circular Focus and explained how EU-level circular economy, digitalisation and innovation priorities can be translated into regional smart specialisation contexts. Second, it presented the evidence base from industry and policy interviews, showing that companies face combined challenges related to regulation, investment risk, skills, market readiness, supply-chain coordination and digital adoption. Third, it demonstrated through the STRATLAB process that structured policy–industry dialogue can validate service needs, identify implementation gaps and strengthen the role of DIHs and EDIHs as circular transition brokers.

The main conclusion is that circular RIS3 implementation should be treated as a systemic transformation agenda. Circularity should not be understood only as an environmental objective or compliance obligation. It should be positioned as a source of innovation, competitiveness, resilience and value-chain modernisation. For SMEs, this means that circular transition must be linked to practical benefits such as cost reduction, market access, resource efficiency, regulatory readiness and new business opportunities.

A second conclusion is that DIHs, EDIHs, clusters and associated service providers have a strategic role in this transformation. Their function should go beyond generic digitalisation support. They can act as intermediaries that connect digital tools with circular business models, ESG and sustainability data, regulatory guidance, funding access, testing infrastructures and policy feedback. In this sense, SMART CIRCUIT expands the understanding of DIHs from technology service providers towards circular transition brokers.

A third conclusion is that policy scale-up requires an integrated instrument mix. Circular transition cannot be advanced through one single measure. It requires low-threshold experimentation support, sector-specific demonstrators, public procurement as a market driver, regulatory translation, skills development, ecosystem coordination and interregional cooperation. These instruments should be aligned with different maturity stages, from early exploration to systemic scale-up.

Finally, SMART CIRCUIT underlines the importance of transnational synergies. Circular value chains, digital infrastructures, secondary material flows and specialised pilot environments often exceed the boundaries of individual regions. Regions should therefore use RIS3 priorities not only to strengthen local ecosystems, but also to build interregional partnerships, shared learning processes and European-level scale-up pathways.

Taken together, the findings and recommendations of this report provide a practical framework for moving from circular economy ambition to implementation. SMART CIRCUIT contributes to this transition by demonstrating how evidence, validation, brokerage and strategic recommendations can be combined into a scalable model for circular and digital transformation in regional innovation ecosystems.